MITSUBISHI

Q64AD-GH Channel Isolated High Resolution Analog-Digital Converter Module

Thank you for buying the Mitsubishi programmable controller MELSEC Q Series.

Prior to use, please read both this manual and detailed manual thoroughly and familiarize yourself with the product.

MELSEC-Q

Mitsubishi Programmable Controller

User's Manual (Hardware)

MODEL	Q-A/D-GH-U-HW
MODEL Code	13JT82

IB-0800223-D (0810) MEE

● SAFETY PRECAUTIONS ●

(Read these precautions before using.)

When using Mitsubishi equipment, thoroughly read this manual and the related manuals introduced in the manual. Also pay careful attention to safety and handle the module correctly.
These precautions apply only to this product. Refer to the user's manual of the CPU module to use for the programmable cntroller system safety precautions.
These ● SAFETY PRECAUTIONS ● classify the safety precautions into two categories: "DANGER" and "CAUTION".

⚠DANGER	**Procedures which may lead to a dangerous condition and cause death or serious injury if not carried out correctly.**
⚠CAUTION	**Procedures which may lead to a dangerous condition and cause superficial to medium injury, or physical damage only, if not carried out correctly.**

Depending on circumstances, procedures indicated by ⚠**CAUTION** may also cause serious accidents.
In any case, it is important to follow the directions for usage.
Store this manual in a safe place and read it whenever necessary. Always forward it to the end user.

[DESIGN PRECAUTIONS]

⚠CAUTION

- Do not bunch the control wires or communication cables with the main circuit or power wires, or install them close to each other.
  They should be installed 100 mm (3.94 inch) or more from each other.
  Otherwise, noise may occur and result in malfunction.

[INSTALLATION PRECAUTIONS]

⚠CAUTION

- Use the programmable controller in an environment that meets the general specifications given in the User's Manual of the CPU module being used.
  Using this programmable controller in an environment outside the range of the general specifications may cause electric shock, fire, malfunction, and damage to or deterioration of the product.
- To mount the module, while pressing the module mounting lever located in the lower part of the module, fully insert the module fixing projection(s) into the hole(s) in the base unit and press the module until it snaps into place. Incorrect mounting may cause malfunction, failure or drop of the module. When using the programmable controller in an environment of frequent vibrations, fix the module with a screw.
  If the screws are loose, it may cause the module to fallout, short circuits, or malfunction.
  If the screws are tightened too much, it may cause damage to the screw and/or the module, resulting in fallout, short circuits or malfunction.
- Switch all phases of the external power supply off when mounting or removing the module. Otherwise, the module may be damaged.
- Do not directly touch the conductive area or electronic components of the module. Otherwise, the module may malfunction or go down.

[WIRING PRECAUTIONS]

⚠CAUTION

- When turning on the power and operating the module after wiring is completed, always attach the terminal cover included with the product.
  There is a risk of electric shock if the terminal cover is not attached.
- Tighten the terminal screws within the range of specified torque.
  If the terminal screws are loose, it may result in short circuits or malfunction.
  If the terminal screws are tightened too much, it may cause damage to the screw and/or the module, resulting in short circuits or malfunction.
- Use applicable solderless terminals and tighten them within the specified torque range.
  If any spade solderless terminal is used, it may be disconnected when the terminal screw comes loose, resulting in failure.
- Be careful not to let foreign matters such as sawdust or wire chips get inside the module.
  These may cause fires, failure or malfunction.
- The top surface of the module is covered with protective film to prevent foreign objects such as cable offcuts from entering the module when wiring.
  Do not remove this film until the wiring is complete.
  Before operating the system, be sure to remove the film to provide adequate heat ventilation.

ABOUT MANUAL

The following manual is also related to this product. If necessary, order it by quoting the details in the table below.

Related Manual

Manual name	Manual No. (Model code)
Channel Isolated High Resolution Analog-Digital Converter Module/Channel Isolated High Resolution Analog-Digital Converter Module (with signal conditioning function) User's Manual	SH-080277 (13JR51)

Compliance with the EMC and Low Voltage Directives

(1) For programmable controller system
To configure a system meeting the requirements of the EMC and Low Voltage Directives when incorporating the Mitsubishi programmable controller (EMC and Low Voltage Directives compliant) into other machinery or equipment, refer to Chapter 9 "EMC AND LOW VOLTAGE DIRECTIVES" of the QCPU User's Manual (Hardware Design, Maintenance and Inspection).
The CE mark, indicating compliance with the EMC and Low Voltage Directives, is printed on the rating plate of the programmable controller.

(2) For the product
No additional measures are necessary for the compliance of this product with the EMC and Low Voltage Directives.

1. Overview

This manual describes the specifications and part names for the type Q64AD-GH channel isolated high resolution analog-digital converter module (hereinafter Q64AD-GH) to be used in combination with the MELSEC-Q Series CPU module.

2. Specifications

The specifications for the Q64AD-GH are shown in the following table. For general specifications for the Q64AD-GH, refer to the operation manual for the CPU module being used.

Item \ Model name			Q64AD-GH
Number of analog input points			4 points (4 channels)
Analog input	Voltage		-10 to 10VDC (Input resistance 1 MΩ)
	Current		0 to 20mADC (Input resistance 250 Ω)
Digital output			16-bit signed binary (-32768 to 32767) 32-bit signed binary (-65536 to 65535)
I/O characteristics, maximum resolution			See the table below
Accuracy (Accuracy relative to digital output value)	Reference accuracy *1		±0.05% Digital output value (32-bit) : ±32digit *2 Digital output value (16-bit) : ±16digit *2
	Temperature coefficient *3		±71.4ppm/°C (0.00714%/°C)
Common mode characteristic			Common mode voltage Input-Common ground (input voltage 0V): 1780VAC
			Common mode voltage rejection ratio (VCM < 1780V): 60Hz 105dB, 50Hz 107dB
Conversion speed			10ms/4 channels
Absolute maximum input			Voltage: ± 15V Current: ± 30mA *4
Isolation specifications			See the table below
Maximum number of writes for E²PROM			Maximum 100,000
Number of I/O occupied points			16 points (I/O assignment: Intelligent 16 points)
Connected terminal			18 points terminal block
Applicable wire size			0.3 to 0.75mm²
Applicable solderless terminals			R1.25 - 3 (Solderless terminals with sleeves are not applicable)
Internal current consumption (5VDC)			0.89A
Weight			0.20kg

I/O characteristics, maximum resolution

Input	Analog input range	Maximum resolution 32-bit	Maximum resolution 16-bit	Digital output value (32-bit)	Digital output value (16-bit)
Voltage	0 to 10V	156.3μV	312.6μV	0 to 64000	0 to 32000
	0 to 5V	78.2μV	156.4μV		
	1 to 5V	62.5μV	125.0μV		
	1 to 5V (Expanded mode)	62.5μV	-	-16000 to 72000	-
	Users input range (Uni-polar)	47.4μV	94.8μV	0 to 64000	0 to 32000
	-10 to 10V	156.3μV	312.6μV	-64000 to 64000	-32000 to 32000
	Users input range (Bi-polar)	47.4μV	94.8μV		
Current	0 to 20mA	312.5nA	625.0μV	0 to 64000	0 to 32000
	4 to 20mA	250.0nA	500.0μV		
	4 to 20mA (Expanded mode)	250.0nA	-	-16000 to 72000	-
	Users input range (Uni-polar)	151.6nA	303.2μV	0 to 64000	0 to 32000

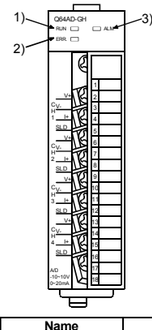
Isolation specifications

Specific isolated area	Isolation method	Dielectric withstand voltage	Insulation resistance
Between I/O terminal and programmable controller power supply	Photocoupler insulation	1780VAC rms/3 cycles (elevation 2000m)	500VDC 10MΩ or more
Between analog input channels	Transformer isolation		

*1: Accuracy of offset/gain setting at ambient temperature
*2: "digit" indicates a digital output value.
*3: Accuracy per temperature change of 1 °C
Example: Accuracy when temperature changes from 25 to 30 °C
0.05% (reference accuracy) + 0.00714 %/°C (temperature coefficient) x 5 °C (temperature change difference) = 0.0857%
*4: Current value indicates value of instant input current that does not break module inner electrical resistance.

3. Part Identification Nomenclature

This section explains the part names for the Q64AD-GH.



Terminal number	Signal name	
1	Empty	
2	Empty	
3	CH1	V+
4		V–
5		I+
6		SLD
7	CH2	V+
8		V–
9		I+
10		SLD
11	CH3	V+
12		V–
13		I+
14		SLD
15	CH4	V+
16		V–
17		I+
18		SLD

Number	Name	Description
1)	RUN LED	Displays the operating status of the Q64AD-GH. On : Normal operation Flickering : During offset/gain setting mode Off : 5V power supply interrupted, watch dog timer error or module exchangeable status during online module replacement
2)	ERR. LED	Displays the error status of the Q64AD-GH. On : Error (A/D conversion continues.) Flickering : Error (A/D conversion stops.) Off : Normal operation
3)	ALM LED	Displays the warning status of the Q64AD-GH. On : An alarm (process alarm, rate alarm) is being generated. Flickering : An input signal error is being generated. Off : Normal operation

4. Precautions for Use

(1) Do not drop or apply strong shock to the module.
(2) Do not remove the PCB of the module from its case.
Doing so may cause the module to fail.
(3) Prevent foreign matter such as dust or wire chips from entering the module.
Such foreign matter can cause a fire, failure, or malfunction.
(4) A protective film is attached to the top of the module to prevent foreign matter, such as wire chips, from entering the module during wiring.
Do not remove the film during wiring.
Remove it for heat dissipation before system operation.
(5) Before touching the module, always touch grounded metal, etc. to discharge static electricity from human body, etc.
Not doing so can cause the module to fail or malfunction.
(6) Tighten the terminal screws using torque within the following ranges. Loose screws may cause short circuits, mechanical failures or malfunctions.

Screw location	Tightening torque range
Module fixing screw (M3 screw)	0.36 to 0.48 N · m
Terminal block terminal screw (M3 screw)	0.42 to 0.58 N · m
Terminal block mounting screw (M3.5 screw)	0.66 to 0.89 N · m

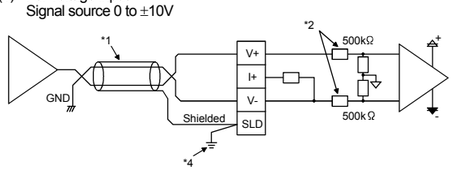
5. Wiring

5.1 Wiring precautions

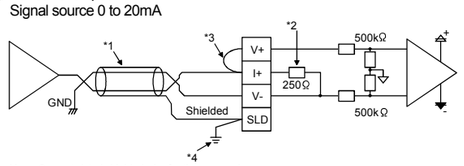
(1) Use separate cables for the AC control circuit and the external input signals of the Q64AD-GH to avoid the influence of the AC side surges and inductions.
(2) Perform an one-point grounding for shielded lines and the shields of sealed cables.
(3) Do not mount the cables close to or bundle them with the main circuit line, a highvoltage cable or a load cable from other than the programmable controller. This may increase the effects of noise, surges and induction.
(4) Perform an one-point grounding for shielded lines and the shields of sealed cables.
(5) A solderless terminal with insulating sleeve cannot be used for the terminal block. Covering the cable-connection portion of the solderless terminal with a marked tube or an insulation tube is recommended.

5.2 External wiring

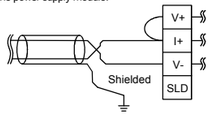
(1) For voltage input
Signal source 0 to ±10V



(2) For current input
Signal source 0 to 20mA



*1 Use a 2-core twisted shielded wire for the power wire.
*2 Shows input resistance.
*3 For current input, be sure to connect to (V+) and (I+) terminals.
*4 Be sure to ground the shield wire of each channel.
The SLD terminal can be used when grounding, however it has not been wired inside the board. Ground it as shown in the diagram shown above or below.
In addition, ground the FG of the power supply module.



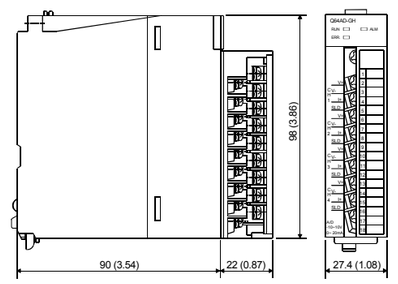
5.3 Switch setting for intelligent functional module

The settings for the intelligent function module are performed using the I/O assignment settings for the GX Developer.
It can be easy to set by inputting in hexadecimal-4 digits.

	Setting item	
Switch 1	Input range setting □□□□ H CH4 CH3 CH2 CH1	Analog input range / Input range setting value: 4 to 20mA: 0H 0 to 20mA: 1H 1 to 5V: 2H 0 to 5V: 3H – 10 to 10V: 4H 0 to 10V: 5H 4 to 20mA (Expanded mode): AH 1 to 5V (Expanded mode): CH User range setting (Uni-polar): EH User range setting (Bi-polar): FH
Switch 2	Empty	
Switch 3	Empty	
Switch 4	□□□□ H 000H Fixed 0H : Normal mode (A/D conversion processing) 1H to FH (numeric value other than 0H) * : Offset/gain setting mode	
Switch 5	0H : Fixed	

* Setting any value within the setting range will provide the same operation.
When the setting range is 1H to FH, set 1H for example.

6. External Dimensions



unit (mm (in.))

Warranty

Mitsubishi will not be held liable for damage caused by factors found not to be the cause of Mitsubishi; machine damage or lost profits caused by faults in the Mitsubishi products; damage, secondary damage, accident compensation caused by special factors unpredictable by Mitsubishi; damages to products other than Mitsubishi products; and to other duties.

⚠For safe use

- This product has been manufactured as a general-purpose part for general industries, and has not been designed or manufactured to be incorporated in a device or system used in purposes related to human life.
- Before using the product for special purposes such as nuclear power, electric power, aerospace, medicine or passenger movement vehicles, consult with Mitsubishi.
- This product has been manufactured under strict quality control. However, when installing the product where major accidents or losses could occur if the product fails, install appropriate backup or failsafe functions in the system.

Country/Region	Sales office/Tel
U.S.A	Mitsubishi Electric Automation Inc. 500 Corporate Woods Parkway Vernon Hills, IL 60061, U.S.A. Tel : +1-847-478-2100
Brazil	MELCO-TEC Rep. Com.e Assessoria Tecnica Ltda. Rua Correia Dias, 184, Edificio Paraiso Trade Center-8 andar Paraiso, Sao Paulo, SP Brazil Tel : +55-11-5908-8331
Germany	Mitsubishi Electric Europe B.V. German Branch Gothaer Strasse 8 D-40880 Ratingen, GERMANY Tel : +49-2102-486-0
U.K	Mitsubishi Electric Europe B.V. UK Branch Travellers Lane, Hatfield, Hertfordshire., AL10 8XB, U.K. Tel : +44-1707-276100
Italy	Mitsubishi Electric Europe B.V. Italian Branch Centro Dir. Colleoni, Pal. Perseo-Ingr.2 Via Paracelso 12, I-20041 Agrate Brianza., Milano, Italy Tel : +39-039-60531
Spain	Mitsubishi Electric Europe B.V. Spanish Branch Carretera de Rubi 76-80, E-08190 Sant Cugat del Valles, Barcelona, Spain Tel : +34-93-565-3131
France	Mitsubishi Electric Europe B.V. French Branch 25, Boulevard des Bouvets, F-92741 Nanterre Cedex, France TEL: +33-1-5568-5568
South Africa	Circuit Breaker Industries Ltd. Private Bag 2016, ZA-1600 Isando, South Africa Tel : +27-11-928-2000

Country/Region	Sales office/Tel
Hong Kong	Mitsubishi Electric Automation (Hong Kong) Ltd. 10th Floor, Manulife Tower, 169 Electric Road, North Point, Hong Kong Tel : +852-2887-8870
China	Mitsubishi Electric Automation (Shanghai) Ltd. 4/F Zhi Fu Plazz, No.80 Xin Chang Road, Shanghai 200003, China Tel : +86-21-6120-0808
Taiwan	Setsuyo Enterprise Co., Ltd. 6F No.105 Wu-Kung 3rd.Rd, Wu-Ku Hsiang, Taipei Hsine, Taiwan Tel : +886-2-2299-2499
Korea	Mitsubishi Electric Automation Korea Co., Ltd. 1480-6, Gayang-dong, Gangseo-ku Seoul 157-200, Korea Tel : +82-2-3660-9552
Singapore	Mitsubishi Electric Asia Pte, Ltd. 307 Alexandra Road #05-01/02, Mitsubishi Electric Building, Singapore 159943 Tel : +65-6470-2460
Thailand	Mitsubishi Electric Automation (Thailand) Co., Ltd. Bang-Chan Industrial Estate No.111 Moo 4, Serithai Rd, T.Kannayao, A.Kannayao, Bangkok 10230 Thailand Tel : +66-2-517-1326
Indonesia	P.T. Autoteknindo Sumber Makmur Muara Karang Selatan, Block A/Utara No.1 Kav. No.11 Kawasan Industri Pergudangan Jakarta - Utara 14440, P.O.Box 5045 Jakarta, 11050 Indonesia Tel : +62-21-6630833
India	Messung Systems Pvt, Ltd. Electronic Sadan NO:III Unit No15, M.I.D.C Bhosari, Pune-411026, India Tel : +91-20-2712-3130
Australia	Mitsubishi Electric Australia Pty. Ltd. 348 Victoria Road, Rydalmere, N.S.W 2116, Australia Tel : +61-2-9684-7777

MITSUBISHI ELECTRIC CORPORATION
HEAD OFFICE : TOKYO BUILDING, 2-7-3 MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN
NAGOYA WORKS : 1-14, YADA-MINAMI 5-CHOME, HIGASHI-KU, NAGOYA, JAPAN

When exported from Japan, this manual does not require application to the Ministry of Economy, Trade and Industry for service transaction permission.